IT IS CLAIMED

1. A method for facilitating communications between a network node and a Head End of an access network, the access network including a plurality of nodes which communicate with the Head End via at least one upstream channel and at least one downstream channel, the method comprising:

configuring the Head End to utilize a first modulation profile for receiving communication signals from at least one network node via a first channel;

detecting a change in at least one channel condition on the first channel; and

dynamically configuring the Head End to use a second modulation profile for receiving communication signals on the first channel, wherein said dynamically configuring is performed in response to the at least one channel condition change being detected on the first channel.

2. The method of claim 1 further comprising:

de-modulating, using the first modulation profile, communication signals received on the first channel before the change in the at least one channel condition has been detected; and

de-modulating, using the second modulation profile, communication signals received on the first channel after the change in the at least one channel condition has been detected.

3. The method of claim 1 wherein the first channel corresponds to an upstream channel used by at least one network node for transmitting data to the Head End.

4. The method of claim 1 wherein the at least one channel condition change includes a change in the value of a signal-to-noise (SNR) ratio on the first channel.

5. The method of claim 4 wherein said dynamic modulation profile change occurs in response to the signal-to-noise (SNR) ratio value on the first channel decreasing below a predetermined value of n dB.

6. The method of claim 5 wherein the value n is equal to 25dB.

7. The method of claim 5 wherein the value n is a value selected from the range of 15 dB to 25 dB.

8. The method of claim 5 wherein the first modulation profile includes QAM modulation, and the second modulation profile includes QPSK modulation.

9. The method of claim 4 wherein said dynamic modulation profile change occurs in response to the signal-to-noise (SNR) ratio value on the first channel increasing above a predetermined value of n dB.

10. The method of claim 9 wherein the value n is equal to 25dB.

11. The method of claim 9 wherein the value n is a value selected from the range of 15 dB to 25 dB.

12. The method of claim 9 wherein the first modulation profile includes QPSK modulation, and the second modulation profile includes QAM modulation.

13. The method of claim 1 wherein the at least one channel condition change includes a change in a first value relating to a number of corrupted packets received via the first channel which can be corrected using Forward Error Correction (FEC).

14. The method of claim 1 wherein said dynamic modulation profile change occurs in response to an FEC factor value increasing above a predetermined value of k percent, wherein the FEC factor value corresponds to a ratio of a number of corrupted packets received via the first channel which can be corrected using Forward Error Correction (FEC) to a total number of packets received via the first channel during a predetermined time interval.

15. The method of claim 14 wherein the value k is equal to 3 percent.

16. The method of claim 14 wherein the value k is a value selected from the range of 1-6 percent.

17. The method of claim 14 wherein the first modulation profile includes QAM modulation, and the second modulation profile includes QPSK modulation.

18. The method of claim 1 wherein said dynamic modulation profile change occurs in response to an FEC factor value decreasing below a predetermined value of k percent, wherein the FEC factor value corresponds to a ratio of a number of corrupted packets received via the first channel which can be corrected using Forward Error Correction (FEC) to a total number of packets received via the first channel during a predetermined time interval.

19. The method of claim 18 wherein the value k is equal to 3 percent.

20. The method of claim 18 wherein the value k is a value selected from the range of 1-6 percent.

21. The method of claim 18 wherein the first modulation profile includes QPSK modulation, and the second modulation profile includes QAM modulation.

22. The method of claim 1 wherein the at least one channel condition change includes a change in a second value relating to a number of corrupted packets received via the first channel which are not able to be corrected using Forward Error Correction.

23. The method of claim 1 wherein said dynamic modulation profile change occurs in response to an UN-FEC factor value increasing above a predetermined value of j percent, wherein the UN-FEC factor value corresponds to a ratio of a number of corrupted packets received via the first channel which can not be corrected using Forward Error Correction to a total number of packets received via the first channel during a predetermined time interval.

24. The method of claim 23 wherein the value j is equal to 1 percent.

25. The method of claim 23 wherein the first modulation profile includes QAM modulation, and the second modulation profile includes QPSK modulation.

26. The method of claim 1 wherein said dynamic modulation profile change occurs in response to an UN-FEC factor value decreases below a predetermined value of j percent, wherein the UN-FEC factor value corresponds to a ratio of a number of corrupted packets received via the first channel which can not be corrected using Forward Error Correction to a total number of packets received via the first channel during a predetermined time interval.

27. The method of claim 26 wherein the value j is equal to 1 percent.

28. The method of claim 26 wherein the first modulation profile includes QPSK modulation, and the second modulation profile includes QAM modulation.

29. The method of claim 1 wherein said dynamic modulation profile change occurs in response to:

a signal-to-noise (SNR) ratio value on the first channel being above a predetermined value of n dB

an FEC factor value being below a predetermined value of k percent, wherein the FEC factor value corresponds to a ratio of a number of corrupted packets received via the first channel which can be corrected using Forward Error Correction (FEC) to a total number of packets received via the first channel during a predetermined time interval; and

an UN-FEC factor value being below a predetermined value of j percent, wherein the UN-FEC factor value corresponds to a ratio of a number of corrupted packets received via the first channel which can not be corrected using Forward Error Correction to a total number of packets received via the first channel during a predetermined time interval.

30. The method of claim 1 further comprising dynamically configuring the first channel to utilize said second modulation profile, wherein said dynamically configuring of the first channel is performed in response to the at least one channel condition change being detected on the first channel.

31. The method of claim 1 further comprising automatically transmitting a modulation profile change message to the at least one network node to thereby cause the network node to use the second modulation profile when transmitting data to the Head End via the first channel.

32. The method of claim 31 further comprising:

responding to the modulation profile change message by dynamically configuring the network node to utilize the second modulation profile when transmitting at least one signal to the Head End via the first channel.

33. The method of claim 1 wherein said access network is a wireless network.

34. The method of claim 1 wherein said access network is a cable network, said plurality of nodes are cable modems, and wherein said Head End comprises a Cable Modem Termination System (CMTS).

35. A system for facilitating communications in an access network, the access network including a plurality of nodes, the system comprising:

a Head End in communication with at least a portion of the network nodes;

the Head End including a first interface configured or designed to receive data from at least one network node via a first channel;

the Head End including a demodulation system configured to demodulate, using a first modulation profile, communication signals received from network nodes via the first channel;

the Head End being further configured or designed to detect a change in at least one channel condition on the first channel; and

the Head End being further configured or designed to dynamically re-configure the demodulation system to use a second modulation profile for demodulating signals received on the first channel, wherein said re-configuring is performed in response to the at least one channel condition change being detected on the first channel.

36. The method of claim 35 wherein the first channel corresponds to an upstream channel used by at least one network node for transmitting data to the Head End.

37. The system of claim 35 wherein the at least one channel condition change includes a change in the value of a signal-to-noise (SNR) ratio on the first channel.

38. The system of claim 37 wherein said demodulation system re-configuration occurs in response to the signal-to-noise (SNR) ratio value on the first channel decreasing below a predetermined value of n dB.

39. The system of claim 38 wherein the value n is equal to 25dB.

40. The system of claim 38 wherein the value n is a value selected from the range of 15 dB to 25 dB.

41. The system of claim 38 wherein the first modulation profile includes QAM modulation, and the second modulation profile includes QPSK modulation.

42. The system of claim 37 wherein said demodulation system re-configuration occurs in response to the signal-to-noise (SNR) ratio value on the first channel increasing above a predetermined value of n dB.

43. The system of claim 42 wherein the value n is equal to 25dB.

44. The system of claim 42 wherein the value n is a value selected from the range of 15 dB to 25 dB.

45. The system of claim 42 wherein the first modulation profile includes QPSK modulation, and the second modulation profile includes QAM modulation.

46. The system of claim 35 wherein the at least one channel condition change includes a change in a first value relating to a number of corrupted packets received via the first channel which can be corrected using Forward Error Correction (FEC).

47. The system of claim 35 wherein said demodulation system re-configuration occurs in response to an FEC factor value increasing above a predetermined value of k percent, wherein the FEC factor value corresponds to a ratio of a number of corrupted packets received via the first channel which can be corrected using Forward Error Correction (FEC) to a total number of packets received via the first channel during a predetermined time interval.

48. The system of claim 47 wherein the value k is equal to 3 percent.

49. The system of claim 47 wherein the value k is a value selected from the range of 1-6 percent.

50. The system of claim 47 wherein the first modulation profile includes QAM modulation, and the second modulation profile includes QPSK modulation.

51. The system of claim 35 wherein said demodulation system re-configuration occurs in response to an FEC factor value decreasing below a predetermined value of k percent, wherein the FEC factor value corresponds to a ratio of a number of corrupted packets received via the first channel which can be corrected using Forward Error Correction (FEC) to a total number of packets received via the first channel during a predetermined time interval.

52. The system of claim 51 wherein the value k is equal to 3 percent.

53. The system of claim 51 wherein the value k is a value selected from the range of 1-6 percent.

54. The system of claim 51 wherein the first modulation profile includes QPSK modulation, and the second modulation profile includes QAM modulation.

55. The system of claim 35 wherein the at least one channel condition change includes a change in a second value relating to a number of corrupted packets received via the first channel which are not able to be corrected using Forward Error Correction.

56. The system of claim 35 wherein said demodulation system re-configuration occurs in response to an UN-FEC factor value increasing above a predetermined value of j percent, wherein the UN-FEC factor value corresponds to a ratio of a number of corrupted packets received via the first channel which can not be corrected using Forward Error Correction to a total number of packets received via the first channel during a predetermined time interval.

57. The system of claim 56 wherein the value j is equal to 1 percent.

58. The system of claim 56 wherein the first modulation profile includes QAM modulation, and the second modulation profile includes QPSK modulation.

59. The system of claim 35 wherein said demodulation system re-configuration occurs in response to an UN-FEC factor value decreases below a predetermined value of j percent, wherein the UN-FEC factor value corresponds to a ratio of a number of corrupted packets received via the first channel which can not be corrected using Forward Error Correction to a total number of packets received via the first channel during a predetermined time interval.

60. The system of claim 59 wherein the value j is equal to 1 percent.

61. The system of claim 59 wherein the first modulation profile includes QPSK modulation, and the second modulation profile includes QAM modulation.

62. The system of claim 35 wherein said demodulation system re-configuration occurs in response to:

a signal-to-noise (SNR) ratio value on the first channel being above a predetermined value of n dB

an FEC factor value being below a predetermined value of k percent, wherein the FEC factor value corresponds to a ratio of a number of corrupted packets received via the first channel which can be corrected using Forward Error Correction (FEC) to a total number of packets received via the first channel during a predetermined time interval; and

an UN-FEC factor value being below a predetermined value of j percent, wherein the UN-FEC factor value corresponds to a ratio of a number of corrupted packets received via the first channel which can not be corrected using Forward Error Correction to a total number of packets received via the first channel during a predetermined time interval.

63. The system of claim 35 wherein the Head End is configured or designed to dynamically re-configuring the first channel to utilize said second modulation profile, wherein said dynamically re-configuring of the first channel is performed in response to the at least one channel condition change being detected on the first channel.

64. The system of claim 35 further comprising:

a first network node of the plurality of nodes, wherein the first network node communicates with the Head End via the first channel; and

wherein the Head End is further configured or designed to automatically transmit a modulation profile change message to the first network node to thereby cause the first network node to use the second modulation profile when transmitting data to the Head End via the first channel.

65. The system of claim 64 where the first network node is configured or designed to respond to the modulation profile change message by dynamically re-

configuring itself to utilize the second modulation profile when transmitting at least one signal to the Head End via the first channel.

66. The system of claim 35 wherein said access network is a wireless network.

67. The system of claim 35 wherein said access network is a cable network, said plurality of nodes are cable modems, and wherein said Head End comprises a Cable Modem Termination System (CMTS).

68. A computer program product for facilitating communications between a network node and a Head End of an access network, the access network including a plurality of nodes which communicate with the Head End via at least one upstream channel and at least one downstream channel, the computer program product comprising:

a computer usable medium having computer code embodied therein, the computer readable code comprising:

computer code for receiving a first communication signal from at least one network node via a first channel;

computer code for de-modulating the first communication signal using a first modulation profile;

computer code for detecting a change in at least one channel condition on the first channel; and

computer code for dynamically configuring the Head End to use a second modulation profile for receiving signals on the first channel, wherein said dynamically configuring is performed in response to the at least one channel condition change being detected on the first channel.

69. The computer program product of claim 68.50 wherein said dynamic modulation profile change code is implemented in response to the signal-to-noise (SNR) ratio value on the first channel decreasing below a predetermined value of n dB.

70. The computer program product of claim 68 wherein said dynamic modulation profile change code is implemented in response to an FEC factor value

increasing above a predetermined value of k percent, wherein the FEC factor value corresponds to a ratio of a number of corrupted packets received via the first channel which can be corrected using Forward Error Correction (FEC) to a total number of packets received via the first channel during a predetermined time interval.

71. The computer program product of claim 68 wherein said dynamic modulation profile change code is implemented in response to an UN-FEC factor value decreases below a predetermined value of j percent, wherein the UN-FEC factor value corresponds to a ratio of a number of corrupted packets received via the first channel which can not be corrected using Forward Error Correction to a total number of packets received via the first channel during a predetermined time interval.

72. The computer program product of claim 68 wherein said dynamic modulation profile change code is implemented in response to:

a signal-to-noise (SNR) ratio value on the first channel being above a predetermined value of n dB

an FEC factor value being below a predetermined value of k percent, wherein the FEC factor value corresponds to a ratio of a number of corrupted packets received via the first channel which can be corrected using Forward Error Correction (FEC) to a total number of packets received via the first channel during a predetermined time interval; and

an UN-FEC factor value being below a predetermined value of j percent, wherein the UN-FEC factor value corresponds to a ratio of a number of corrupted packets received via the first channel which can not be corrected using Forward Error Correction to a total number of packets received via the first channel during a predetermined time interval.

73. The computer program product of claim 68 further comprising computer code for automatically transmitting a modulation profile change message to the at least one network node to thereby cause the network node to use the second modulation profile when transmitting data to the Head End via the first channel.

74. A system for facilitating communications between a network node and a Head End of an access network, the access network including a plurality of nodes which

communicate with the Head End via at least one upstream channel and at least one downstream channel, the system comprising:

means for receiving a first communication signal from at least one network node via a first channel;

means for de-modulating the first communication signal using a first modulation profile;

means for detecting a change in at least one channel condition on the first channel; and

means for dynamically configuring the Head End to use a second modulation profile for receiving signals on the first channel, wherein said dynamically configuring means is implemented in response to the at least one channel condition change being detected on the first channel.